ORIGINAL ARTICLE

Severity, Timing, and Duration of Reactions to Trauma in the Population: An Example from Mexico

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Background: *Normative data describing acute reactions to trauma are few.*

Methods: *Of 2509 Mexican adults interviewed with the Composite International Diagnostic Interview, 1241 met trauma exposure criteria for index events occurring more than 1 year previously.*

Results: *The modal response, describing 45%, was a reaction to trauma that was mild (present but below levels of posttraumatic stress disorder symptom criteria), immediate (within the first month), and transient (over within a year). Nonetheless, 29% experienced immediate and serious reactions. Of these, 44% had chronic posttraumatic stress disorder symptoms. Those whose reactions were serious and chronic differed in many ways from those whose reactions were serious but transient. They had more traumatic events during their lives, and their index events were more likely to have occurred in childhood and to have involved violence. They had more symptoms and functional impairment after the trauma and higher levels of depressive and somatic symptoms when data were collected.*

Conclusions: *Psychiatrically significant reactions to trauma persist often enough to justify their detection and treatment. Persons in need of acute intervention can be identified on the basis of the nature and severity of the initial response as well as characteristics of the stressor.*
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Key Words: Posttraumatic stress disorder, acute reactions, epidemiology, Mexico

Introduction

Evidence is growing that symptoms of posttraumatic stress disorder (PTSD) and related conditions are highly prevalent in the immediate aftermath of severe stressors, such as sexual assault (Rothbaum et al 1992), other forms of violence (Birmes et al 2001; Brewin et al 1999), injury-causing accidents (Harvey and Bryant 1999; Holeva et al 2001; Koren et al 1999; Mellman et al 2001; Winston et al 2002), and major disasters (North et al, 1999). In his review of the literature on acute stress responses, Shalev (2002) described PTSD as an impaired recovery of early responses that may in fact be adaptive. For most people, PTSD symptoms do diminish during the first few months, but for a significant minority of survivors they become chronic and enduring (Rothbaum et al 1992; Shalev et al 1998). Such findings have sparked interest in designing interventions that address acute reactions before they become intractable (Litz et al 2002; Ruzek and Watson 2002). Several studies indicate that it may be possible to identify the best candidates for such interventions on the basis of the severity or nature of survivors' initial responses (Brewin et al 1999; Bryant 2000; Bryant et al 2000; Grieger et al 2000; Holeva et al 2001; Rothbaum et al 1992; Waelde et al 2001).

These illustrative studies have shed considerable light on the course of PTSD through time because most of them assessed initial reactions soon after the trauma and followed participants prospectively to assess PTSD; because the samples were often highly selected and composed of people receiving medical treatment, however, findings derived from them cannot be generalized to nontreatment-seeking survivors of trauma. They are thus limited in their ability to describe the normative phenomenology of acute posttraumatic stress. Notwithstanding the limitations of their retrospective designs, data are generally collected in epidemiologic surveys of trauma that may provide insights into the normative patterns of response. The primary purpose of the present analysis was to describe the severity, timing, and duration of reactions to trauma within a randomly selected sample of survivors of a heterogeneous and representative array of potentially traumatic events. A secondary purpose was to identify factors that discriminate between survivors whose initial reactions, although serious, are relatively transient and survivors whose reactions are both serious and chronic. A final purpose was to describe current differences between groups defined according to the severity, timing, and duration of their posttrauma response.

An additional factor that has limited the generalizability of the research base on trauma is its lack of international

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representation. Almost all the data on acute reactions come from the United States, western Europe, or Australia, whereas relatively few data have emerged from poor or economically developing countries. We undertook this study of trauma in Mexico not because we expected the results to be dramatically different from those that have emerged elsewhere in North America but rather out of a belief that it is important to establish a research base that is more cross-culturally valid. As is recommended for investigations in non-Western or developing countries, we conducted a considerable amount of preliminary research on PTSD in Mexico before undertaking the epidemiologic study. In an initial qualitative study (Norris et al 2001b), survivors of various disasters in Mexico were asked to describe their emotional reactions in unstructured interviews. Although we provided little or no prompting, study participants mentioned 14 of the 17 criterion symptoms. The participants also provided an abundance of expressions (e.g., remain affected, always live with the fear, ill from fright [susto], stayed more traumatized) that could not be classified as specific criterion symptoms but clearly implied that the concept of trauma, more globally defined, was a meaningful one. A subsequent quantitative, comparative study was conducted with samples of disaster victims from the United States (Hurricane Andrew, non-Hispanic participants only) and Mexico (Hurricane Paulina). A four-factor measurement model, specified a priori to represent the accepted multicriteria conceptualization of PTSD, fit the data of the US and Mexican samples equally well (Norris et al 2001b). Moreover, symptoms showed a similar rank order of frequency; that is, the symptoms that were most and least common in the United States were also most and least common in Mexico. Altogether, the evidence from the preliminary studies established that PTSD is relevant for and measurable in Mexican trauma survivors. Likewise, analyses of the data from the epidemiologic study (Norris et al, unpublished data) have produced results that are more similar than not to results from other investigations in North America. At 76%, this sample's overall rate of exposure to potentially traumatic events is solidly in the range of previous reports (Breslau et al 1998a; Kessler et al 1995; Resnick et al 1993; Stein et al 1997). Although the lifetime prevalence of PTSD is higher in Mexico (11%) than in the United States (Breslau et al 1998a; Kessler et al 1995), taken as a whole the results from this project suggest that the findings regarding normative patterns presented here are not likely to be highly specific to the Mexican culture or context.

Methods and Materials

Sampling and Interviewing Procedures

A multistage probability sampling design was used to draw samples of adults representative of Oaxaca, Guadalajara, Hermosillo, and Mérida, Mexico. These cities were selected to provide regional and cultural diversity. Oaxaca, population 500,000, is the capital of the state of the same name. Located in the southern mountains of Mexico, Oaxaca has retained a strong flavor of traditional indigenous and Mexican culture. With an economy based in government service and tourism, Oaxaca is among the poorest cities in Mexico. Guadalajara, population 1,646,000 (3 million in the metropolitan area), is Mexico's second largest city. It is a modern, industrial city, and as such it represents the "Mexico of the future," where industrial employment is the primary source of income for most of the population. Hermosillo, population 610,000, is the capital of the state of Sonora in northwestern Mexico. The city's close proximity to the United States (4 hours by car from Tucson) gives it a strong North American flavor. The economy of the region is based on government services, commercial agriculture, and industrial manufacturing for the U.S. market. Mérida, population 705,000, was founded in 1528 and is the governmental and commercial center for the Yucatan peninsula.

We began data collection in Oaxaca. By using the Mexican equivalent of census data, we randomly selected 24 areas (10% of tracts) in Oaxaca for enumeration. From these areas, we selected 903 household units in numbers proportional to the population size of the area. Of these household units, 727 were eligible for the study. Noneligible units were vacant lots or businesses. Of the eligible households, 700 were successfully contacted, and the male or female head was asked whether the household would participate in the study. Of these households, 584 agreed to complete an initial sociodemographic interview about household members. One adult resident was then randomly selected from each of these 584 participating households and asked to participate in an in-depth psychologic interview. Of these adults, 576 completed the psychologic interview, for a final response rate of 79% of those households assessed as eligible. The procedures were the same in the other three cities, yielding *n* values and response rates, respectively, of 713 and 82% in Guadalajara, 618 and 76% in Hermosillo, and 602 and 70% in Mérida. The Oaxaca and Guadalajara data were collected in 1999; the Hermosillo and Mérida data were collected in 2001.

Interviews were completed by trained, local interviewers in the respondents' homes in private. Training consisted of showing the interviewers how to solicit participation in the study, how to protect participants' rights, how to complete the standardized questionnaire, how to ask personal questions respectfully, and how to be sensitive to respondent distress. The demographic interviews lasted about 1 hour, and psychologic interviews lasted an average of 2 hours. Demographic and psychologic interviews were typically completed on separate days, and most were audiotaped. Fieldwork managers checked all interviews for accuracy of selection procedures, completeness, and quality. In addition, they revisited each participating household to deliver a letter of thanks and to ask the respondent for his or her impressions of the interview and interviewer.

Informed consent was obtained from all participants. The study was approved by the institutional review boards of Georgia State University, the University of Guadalajara, and the Welte Institute for Oaxacan Studies.

The total sample was composed of 1602 women and 907 men who ranged in age from 18 to 92 years. The gender distribution was approximately the same in each city. At 64%, women are overrepresented in the sample with psychologic interviews, but the reason for this is not clear. According to the most recent Mexican census data, 55% of adult residents are women. This percentage is substantially greater than 50% because large numbers of Mexican men reside in the United States. The gender distribution of our sociodemographic sample composed of all members of all households that participated in both phases of the survey (psychologic individual studies as well as demographic household studies) matches the census data exactly. This finding suggests that the bias did not occur at the point of household selection or as a result of differential response rates, and therefore it must have occurred at the point of selection for the psychologic interview. This selection was made at the end of the demographic interview, well after the informant had provided the birthdays, birth years, and present residence status of each household member. Fieldwork supervisors reviewed audiotapes of each interview and verified that the interviewer had selected the appropriate adult (the one with the most recent birthday) for the psychologic interview, regardless of who gave the sociodemographic interview or who was home at the time of that initial interview. On average, women had a higher probability of selection because men comprised only a small fraction of adults living alone (28%); however, weighting the data by the number of adults in the household changed the gender distribution of the sample only marginally (from 63.8% to 62.3% women).

Because information was collected about all household members, it was possible to compare selected men and women to the larger "populations" from which they were chosen on several variables. Selected women did not differ significantly from the larger population of women in education or pay. Compared to the population value, selected women worked an average of 2.3 more hours per week [$t(1579) = 2.38$, $p < .05$] and were older by an average of 1 year [$t(1598) = 2.56$, $p < .05$]. At .06 each, the effect sizes (ESs) of these differences were very small. Selected men did not differ from the larger population of men in hours worked per week. They were better educated by an average of .4 years [$t(903) = 2.77$, $p < .01$, ES = .09], they were better paid by an average of 306 pesos for a 2-week period [approximately 15 US dollars per week, $t(828) = 3.25$, $p < .01$, ES = .11], and they were older by an average of 2 years [$t(905) = 3.60$, $p < .01$ ES = .12]. Thus our female sample appears to be quite representative of the larger population of women, but our male sample underrepresents the experiences of younger, lower-income, less-educated men. The magnitude of this bias appears to be relatively small, however. To derive an unbiased population estimate, weights were applied to correct the gender distribution in the total sample to a 55:45 ratio of women to men. These weights were .861 for women and 1.245 for men. For the current analysis, the weighted n (1251) was slightly larger than the actual n (1241), so the sample was weighted by an additional factor (1241/1251) to correct for this.

Measures

LIFETIME TRAUMA AND PTSD. Both exposure to trauma and PTSD were measured with module K of version 2.1 of the Composite International Diagnostic Interview (CIDI), developed and translated into Spanish by the World Health Organization (World Health Organization 1997). The CIDI has been used widely in previous epidemiologic studies, although to our knowledge module K for PTSD had not previously been used in Mexico. For all persons who had experienced one or more events from the event section (A1), the CIDI assesses in order all DSM-IV criteria for PTSD (American Psychiatric Association 1994): A2 (subjective trauma in the form of terror, horror, or helplessness), B (five intrusion symptoms, of which at least one must be present), C (seven avoidance or numbing symptoms, of which at least three must be present), D (five arousal symptoms, of which at least two must be present), E (duration of symptoms of at least 1 month), and F (three indicators of impaired functioning, of which at least one must be present). We modified the protocol slightly so that all questions were asked of anyone who had experienced an event. The typical approach is to skip out once a criterion is not met.

The CIDI is structured such that a respondent who has experienced more than one type of event is asked the symptom, timing, and duration questions only for the single event that he or she considers to have been the most stressful. This is a common approach, but it does constitute a shortcoming of this study. When PTSD related to an event is assessed only among respondents who consider that event to have been their worst experience, estimates of conditional risk are overestimated (Breslau et al 1998a).

To our knowledge no studies have documented the clinical validity of the Spanish version of the CIDI PTSD module. However, Breslau et al (1998b) found good agreement between the English version of the same module and clinicians' evaluations (sensitivity of 95% and specificity of 71%, $\kappa = .63$).

CURRENT WELL-BEING. Two measures provided assessments of current symptoms. Recent depressive symptoms were assessed by the Center for Epidemiologic Studies Depression Scale (CES-D, Radloff 1977). The scale has 20 items and a four-point response format that asks how often various symptoms were experienced in the previous week. Spanish versions of the CES-D have been used frequently with Mexican-Americans and sometimes also with citizens of Mexico and other Latin American countries. Virtually all studies have demonstrated that English and Spanish versions yield data of similar quality (Masten et al 1986; Roberts et al 1989). The scale α in this sample was .86. A broader purpose of our survey was to derive norms for various measures for use in subsequent research. In the total weighted sample, the CES-D mean was 12.0 (SD 9.1).

Physical health problems were measured by the Physical Symptom Checklist (PSC), a scale that has 35 items on a five-point response format, each of which asks about the presence and severity of a symptom or problem during the previous month. The scale was adapted from Leventhal and colleagues (1996) and was designed to cover all major systems, including cardiovascular, musculoskeletal, and respiratory problems, as well as nonspecific symptoms such as headaches and fatigue. Because we found no adequate Spanish-language scale of physical health symptoms, we translated and backtranslated this

measure for use in our survey according to procedures outlined by Brislin and colleagues (1973). The scale α in this sample was .90. In the total weighted sample, the PSC had a mean of 50.7 (SD 14.7).

Results

Altogether, 1889 participants met criterion A1, meaning that they had experienced one or more of the 10 traumatic events assessed by the CIDI. Of these participants, 1462 met criterion A2, meaning that they had experienced horror, terror, or helplessness at the time the event occurred. The current analysis was further limited to the 1241 participants whose index events had occurred no less than 1 year previously, so that all participants had the opportunity to meet the study's criterion for a chronic posttraumatic reaction. This sample was 53% female. In this analysis sample, 26% of the index events involved violence (sexual assault, sexual molestation, physical assault, threat with weapon). Also common were loss of a loved one through accident, suicide, or homicide (21%); life-threatening accidents (17%); and witnessing someone injured or killed (14%). The index trauma had occurred in childhood (at age 12 years or younger) for 13% of participants.

Normative Responses to Trauma

As shown in Table 1, the normative response by far was for some psychologic distress (regardless of severity, timing, or duration) to be experienced after the trauma. Only 5% of the sample had experienced no criterion symptoms. Approximately 32% met all symptom criteria (criteria B, C, and D for PTSD but not necessarily E and F) for at least some period. The most prevalent reaction was between these extremes: 63% had experienced some posttraumatic stress, but to a degree less than that required for a diagnosis of PTSD.

Regardless of the severity or duration, psychologic symptoms had occurred soon after the index event. The modal response, describing 48% of participants, was for the symptoms to begin the same day as the event. Altogether, 86% had experienced the problems within the first month. Delayed reactions were rare (Table 1).

Regardless of the severity or time of onset, symptoms had dissipated within a month of their onset for 42% of participants and within a year for an additional 23%. Chronic problems, lasting longer than 1 year, were reported by 30%. Overall, 14% of these trauma-exposed participants had had some symptoms in the previous year, with 5% reporting symptoms within the previous month.

Data on severity, timing, and duration were combined to determine modal, normative reactions to the index traumas. This combination resulted in nine possible patterns (e.g., mild, immediate, transient; serious, delayed, chronic), as shown in Table 1. Although participants were describing their most stressful event and all had met criterion A2 for PTSD, the modal response was for the psychologic reaction to the trauma to be mild (below criterion level), immediate (within the first month), and transient (lasting less than 1 year). Out of the nine possible patterns (including no reaction) this one pattern described the responses of 45% of participants. Nonetheless, a substantial percentage (29%) had experienced an immediate and serious reaction. Of these participants who had experienced an immediate, serious reaction, roughly half (56%) had recovered in a year's time; however, the remainder (44%) had not.

Table 1. Severity, Timing, and Duration of Responses to the Index Trauma

Variable	%
Severity of Posttraumatic Stress (PTS)	
No symptom	4.9
No criteria met	12.2
1 criterion met	22.8
2 criteria met	27.7
3 (all) criteria met	32.4
Onset of PTS[a]	
Same day	48.1
That week	27.9
That month	9.6
1–6 months	3.2
7–12 months	1.6
>12 months	4.8
Duration of PTS[a]	
<1 week	19.5
1 wk –1 month	22.8
1–6 months	17.3
7–12 months	6.0
>12 months	29.5
Combined Distribution[a]	
Mild, immediate, transient	45.0
Mild, immediate, chronic	11.4
Mild, delayed, transient	2.6
Mild, delayed, chronic	3.6
Serious, immediate, transient	16.4
Serious, immediate, chronic	12.7
Serious, delayed, transient	1.5
Serious, delayed, chronic	1.8
Recency of Problems	
Within past 2 weeks	4.0
2 wk – 1 month ago	1.1
1–6 months ago	4.2
6 mo – 1 year ago	5.0
>1 year ago	80.9

[a]Totals do not equal 100% because of participants with no problem (4.9%).

Table 2. Means and Percentages on Study Variables According to Pattern of Response to Index Trauma

Variable	No or Mild	Serious but Transient	Serious and Chronic	F^a or χ^{2b}	t^c or χ^{2d} Mild vs. Serious	t^c or χ^{2e} Transient vs. Chronic
Age						
Mean	39.2	38.7	41.8	2.07	—	—
SD	15.7	16.0	14.4			
Education						
Mean	9.7	7.9	7.7	21.26[f]	6.52[f]	.44
SD	4.5	4.6	4.8			
Sex (% women)	46.2	57.6	79.1	63.59[f]	43.77[f]	19.10[f]
Lifetime Traumas						
Mean	2.7	3.0	3.5	16.08[f]	5.29[f]	2.58[g]
SD	1.6	1.8	2.0			
Timing of Index Event (% childhood)	15.2	11.3	26.4	12.04[g]	.75	11.09[f]
Type of Index Event (% violence)	22.4	28.9	39.2	19.84[f]	15.59[f]	4.25
B Symptoms, Index						
Mean	1.4	3.2	3.9	344.79[f]	26.18[f]	4.76[f]
SD	1.4	1.3	1.1			
C Symptoms, Index						
Mean	1.1	4.1	4.9	1073.06[f]	46.30[f]	6.47[f]
SD	1.1	1.2	1.3			
D Symptoms, Index						
Mean	1.5	3.6	4.0	522.58[f]	32.33[f]	3.48[f]
SD	1.1	1.1	1.1			
F Indicators, Index						
Mean	.4	1.3	1.9	300.64[f]	23.94[f]	7.80[f]
SD	.7	1.0	1.0			
Current Depressive Symptoms (CES-D)						
Mean	10.8	15.2	19.2	71.55[f]	11.52[f]	4.41[f]
SD	8.2	8.6	11.7			
Current Physical Health Problems (PSC)						
Mean	50.2	56.1	63.0	58.30[f]	10.23[f]	4.52[f]
SD	13.1	15.4	19.1			

CES-D, Center for Epidemiologic Studies Depression Scale; PSC, physical symptom checklist; B, intrusion; C, avoidance/numbing; D, arousal; F, functioning.
[a] $df = (2, 1197)$
[b] $df = (2, n = 1200)$
[c] $df = (1197)$
[d] $df = (1, n = 1200)$
[e] $df = (1, n = 361)$
[f] $p < .001$
[g] $p < .01$

Between-Group Differences

Intervention efforts would be aided by the ability to predict when acutely serious reactions to trauma are most likely to persist, leading to chronic PTSD. In other words, what factors distinguish persons with serious and chronic reactions to trauma from those with serious but transient reactions? Data pertinent to this question are shown in Table 2. We compared the 158 adults who showed serious and chronic reactions with the 203 adults who showed serious but transient reactions. To place these findings in context, the table also provides the data for the 839 participants who had either no symptoms or mild symptomatic reactions, regardless of duration.

Three analyses were conducted. First, for descriptive purposes, analyses of variance were conducted on the data from all three groups. Of more interest than the omnibus *F* values (Table 2) were the two orthogonal planned contrasts: no or mild reaction (group 1) versus serious reaction (groups 2 and 3 combined) and serious and transient reaction (group 2) versus serious but chronic reactions (group 3). Supplementary contingency (χ^2) analyses were conducted for selected nominal variables. Second, to determine which phenomenologic variables best predict the persistence of a serious reaction, a discriminant analysis was conducted on the data from groups 2 and 3. Group 1 was not included in this analysis because it would differ from the other two groups on most of the included measures by definition. Third, to explore the long-term implications of these different patterns of response, regression analyses were conducted in which measures of current well-being, the CES-D and PSC, served as the dependent measures. Because of the number of analyses and the size of the sample, we set α to .01 for tests of statistical significance.

Descriptive Analyses

MILD VERSUS SERIOUS REACTIONS. As noted previously, the first planned contrast in the univariate tests compared participants who reported no or mild reactions with participants who reported serious reactions (Table 2). Participants who had no or mild reactions were less likely to be women and averaged more years of education. On average, they had experienced fewer lifetime traumas, and their index events were less likely to have occurred in childhood or to have involved violence. They reported fewer symptoms and less impairment of functioning after the event. The significant difference in symptom prevalence held for all 17 specific criterion symptoms and for all three indicators of functional impairment; values for $\chi^2(1, n = 1200)$ ranged from 15.21 ($p < .001$, difficulty remembering aspects of the event) to 477.29 ($p < .001$, loss of interest in usual activities).

Group means on the measures of current well-being, the CES-D and PSC, are also shown in Table 2. On average, participants who reported no or mild reactions to the index trauma reported significantly fewer symptoms of depression at the time of the interview than did participants who had more serious reactions to the index trauma. More specifically, CES-D mean of the group with no or mild reaction (group 1) was lower than the norm for Mexico [$t(838) = -4.32$, $p < .01$, Mean difference (M_{diff}) = -1.22], but the mean of the group with serious but transient reaction (group 2) was above the norm [$t(202) = 5.21$, $p < .001$, $M_{diff} = 3.14$], as was that of the group with serious and chronic reaction [group 3, t (157) = 7.76, $p < .001$, $M_{diff} = 7.25$]. Likewise, participants who had no or mild reactions to the index trauma reported significantly fewer health problems at the time of the interview than did participants who had more serious reactions to the index trauma. The PSC mean of the group with no or mild reaction did not differ from the norm for Mexico [$t(838) = -1.14$, $M_{diff} = -.52$], whereas means exceeded the norm in groups with both serious but transient reaction [$t(202) = 4.96$, $p < .001$, $M_{diff} = 5.36$] and serious and chronic reaction [$t(157) = 8.08$, $p < .001$, $M_{diff} = 12.28$]. These effects were of comparable strength and direction for subscales of the CES-D assessing negative affect and (lack of) positive affect and for subscales of the PSC assessing general somatic complaints, musculoskeletal problems, cardiovascular problems, and respiratory problems.

SERIOUS AND CHRONIC VERSUS SERIOUS BUT TRANSIENT REACTIONS. The two groups that had initially serious reactions differed from one another on most study variables (Table 2). Although they did not differ in age or education, the group with serious and chronic reaction was composed of a higher percentage of women than was that with serious but transient reaction. Participants whose reactions became chronic had experienced a greater number of traumas during the course of their lives, and their index events were more likely to have occurred in childhood and to have involved violence.

By definition, both groups with initially serious reaction met criterion B (one or more intrusion symptoms). Despite this restriction of range, participants whose reactions became chronic had greater numbers of intrusion symptoms than did participants whose reactions were more transient. Specifically, they were more likely to report reexperiencing [81% vs. 63%, $\chi^2(1, n = 361) = 15.02$, $p < .001$], nightmares [72% vs. 54%, $\chi^2(1, n = 361) = 12.40$, $p < .001$], and physiologic reactivity [77% vs. 62%, $\chi^2(1, n = 361) = 10.29$, $p < .001$]. Likewise both groups met criterion C (3 or more avoidance or numbing symptoms) by definition. Nevertheless, the group with serious and chronic reaction differed from the group with serious but transient reaction in the number of avoidance and numbing symptoms that they had. Those whose reactions became chronic were more likely to experience foreshortened future [53% vs. 29%, $\chi^2(1, n = 361) = 20.88$, $p < .001$], estrangement from others [73% vs. 51%, $\chi^2(1, n = 361) = 16.96$, $p < .001$], loss of interest 76% vs. 55%, $\chi^2(1, n = 361) = 15.87$, $p < .001$], restricted affect [64% vs. 47%, $\chi^2(1, n = 361) = 9.99$, $p < .001$], and avoiding thoughts [96% vs. 88%, $\chi^2(1, n = 361) = 8.15$, $p < .01$]. In contrast, the group with serious and chronic reaction was less likely than the group with serious but transient reaction to have difficulty remembering aspects of the event [42% vs. 56%, $\chi^2(1, n = 361) = 7.00$, $p < .01$]. Findings for criterion D were similar but less marked. Although all were required to show at least two arousal symptoms, the group with serious and chronic reaction reported more symptoms than did the group with serious but transient reaction; however, differences in prevalence of specific symptoms were significant at the .01 level only for jumpiness, which was more prevalent in the group with serious and chronic reaction than in its counterpart [80% vs. 68%, $\chi^2(1, n = 361) = 6.73$, $p < .01$].

The groups differed in criterion F for PTSD as well. They were not required to meet this criterion to be included in the analysis. This count of indicators of impaired functioning potentially ranged from zero to three. On average, the group with serious and chronic reaction confirmed the presence of two areas of impaired functioning, whereas the average for the group with serious but transient reaction was closer to one. As for the specific indicators, the group with serious and chronic reaction was more likely than the group with serious but transient reaction to report that problems surrounding the event had interfered with normal activities of life [72% vs. 44%, $\chi^2(1, n = 361) = 27.23$, $p < .001$], that they had reduced

Table 3. Results from Discriminant Analysis Predicting Membership in Group with Serious but Transient or Serious and Chronic Response

Predictor Variable	Structure Coefficient	Canonical Coefficient
F Indicators (No.)	.61	.45
C Symptoms (No.)	.58	.33
B Symptoms (No.)	.50	.23
Sex	.43	.47
D Symptoms (No.)	.35	−.04
Event Occurred in Childhood	.34	.31
Lifetime Events (No.)	.23	.16
Event Involved Violence	.21	.11
Age	.18	.40
Education	−.04	.28

Variables are ordered according to the strength of the correlation between the predictor variable and the discriminant function (structure coefficient). F, functioning; C, avoidance/numbing; B, intrusion; D, arousal.

social activities because of these problems [60% vs. 42%, $\chi^2(1, n = 361) = 10.48$, $p < .001$], and that they were upset with themselves because of these problems [63% vs. 41%, $\chi^2(1, n = 361) = 16.99$, $p < .001$].

On average, participants who had serious but transient reactions to their index traumas also reported fewer symptoms of depression (CES-D) or physical health problems (PSC) at the time of the interview than did participants whose reactions had been serious and chronic (see Table 2). On subscale tests, the results did not hold for (lack of) positive affect but did hold for all other subscales mentioned previously.

Discriminant Analyses

Which of these background and trauma-related variables best discriminated between persons whose reactions, although serious, dissipated with time and those whose reactions persisted? These results are shown in Table 3. The overall discriminant function was highly significant [Wilks $\lambda = .78$, $\chi^2(10, n = 361) = 88.93$, $p < .001$, canonic correlation = .47]. Gender, age at interview, age at event, number of avoidance or numbing symptoms, and number of indicators of impaired functioning all made unique contributions to the prediction such that female gender, increasing age, childhood index events, more avoidance symptoms, and more impaired functioning were associated with chronicity. In rank order, impaired functioning was the single best predictor, as shown by the structure coefficients in Table 3.

Regression Analyses

The descriptive data suggested that these different patterns of response to trauma might have different long-term implications for well-being. Regression analyses were conducted to test whether these effects held while controlling for those of age, education, gender, timing and nature of index event, and recency of problems related to the index event. Variables were entered hierarchically in three predetermined steps: (1) demographic and event characteristics, (2) recency of problems, and (3) pattern of response to trauma. Pattern of response to trauma was scored as two orthogonal contrast codes analogous to the planned contrasts used in the analyses of variance. The first contrast code, representing the severity of the initial reaction (no or mild reaction vs. serious reaction), was modestly correlated with recency of problems ($r = .16$), presumably because the 5% of participants who reported no problems were coded as being in the most distant category. The second contrast code, representing the chronicity of the initial reaction (serious but transient vs. serious and chronic), was uncorrelated with recency ($r = .05$).

As might be expected, recency had significant effects on both the CES-D and PSC. After controlling for demographic and event characteristics, the more recent the reported problems related to the index event, the higher the current depressive symptoms [$\beta = .12$, R^2 change = .025, $F(1, 1193) = 34.31$, $p < .001$] and the greater the health problems [$\beta = .14$, R^2 change = .030, $F(1, 1193) = 41.37$, $p < .001$]. Nonetheless, the two contrast codes representing severity and chronicity explained an additional 5% of the variance in depressive symptoms [$F(2, 1191) = 35.93$, $p < .001$]. Each contrast made a unique contribution when predicting CES-D scores (severity of initial reaction $\beta = .23$, $p < .001$; chronicity of initial reaction $\beta = .09$, $p < .001$). Effects were more pronounced for the Negative Affect subscale than for the Positive Affect subscale. For negative affect, final β values were .12 ($p < .001$) for recency, .26 ($p < .001$) for severity, and .10 ($p < .001$) for chronicity. For (lack of) positive affect, final β values were .07 ($p < .01$) for recency, .10 ($p < .001$) for severity, and .04 (not significant) for chronicity.

Recency also had a significant effect on PSC scores. With demographic and event characteristics controlled, the more recent the reported problems related to the index event, the higher the current physical health problems [$\beta = .14$, R^2 change = .030, $F(1, 1193) = 41.37$, $p < .001$]. The two contrast codes explained an additional 4% of the variance in physical health problems [$F(2, 1191) = 28.80$, $p < .001$]. Each contrast again made a unique contribution (severity of initial reaction $\beta = .20$, $p < .001$; chronicity of initial reaction $\beta = .09$, $p < .001$). Findings for subscales of the PSC generally echoed these results. For general somatic complaints, final β values were .15 ($p < .001$) for recency, .20 ($p < .001$) for severity, and .11 ($p < .001$ for chronicity). For musculoskeletal problems, β

values were .08 ($p < .001$) for recency, .07 ($p < .001$) for severity, and .17 ($p < .001$) for chronicity. For respiratory problems, β values were .09 ($p < .001$) for recency, .12 ($p < .001$) for severity, and .08 ($p < .01$) for chronicity. For cardiovascular problems, β values were .12 ($p < .001$) for recency, .15 ($p < .001$) for severity, and .06 (not significant) for chronicity.

Discussion

Before discussing these findings, a few limitations of the study should be acknowledged. The data were collected retrospectively, in most cases many years after the index events had occurred. Surveys such as ours cannot supplant prospective investigations of specific groups of trauma victims but can supplement them with findings from large, representative, and heterogeneous samples. Our findings may not generalize beyond Mexico; previous research suggests that PTSD may be conceptually similar in Mexico and the United States but is somewhat more prevalent in the former than in the latter (Norris et al, unpublished data). We undertook this study because people in developing countries are overall underrepresented in epidemiologic trauma research. Also, the results from this study do not speak to the prevalence of acute stress disorder, which has received considerable attention in recent studies of acute stress (Bryant 2000; Marshall et al 1999). The symptom criteria for acute stress disorder differ from the symptom criteria for PTSD in several respects, most fundamentally in acute stress disorder's emphasis on dissociation, which was not measured in our survey. Nonetheless, the results do provide population-level information about the prevalence of acutely serious stress reactions, which is lacking in the published literature on trauma.

Within the limits of this study's methodology, three primary conclusions may be drawn from these findings. First the modal, normative reaction to trauma is mild (some distress but below criterion level), immediate (within the first month and usually even within the first week), and transient (over within a year and usually within a few months). This single pattern described the results for 45% of respondents, even though all had experienced a stressor sufficiently serious to meet both criteria A1 and A2 for PTSD. It is worth noting that no and delayed symptomatic responses were both quite rare, an observation that Shalev (2002) also made in his review. These findings are consistent with an older literature on normative (nontraumatic) stressful life events showing that the typical reaction to acute stress is mild to moderate in magnitude and is transitory (Norris and Murrell 1987).

Nonetheless, the second primary conclusion to be drawn from these results is that a substantial minority of trauma victims do have acute reactions that are quite serious. We operationalized a severe reaction to trauma as the meeting of all symptom criteria for PTSD (one or more of B subcriteria, three or more of C subcriteria, and two or more of D subcriteria), without regard to duration (E) or functional impairment (F). On the basis of this definition, 32% of survivors showed acutely serious responses to the index traumas. From an epidemiologic perspective, these values are most meaningful when considered in light of the prevalence of trauma itself. As is true in other North American populations, trauma is all too common in Mexico: 76% of adults have experienced a potentially traumatic event, and approximately 60% of adults have experienced terror, horror, or helplessness in response to such an event. Together, these estimates suggest that the lifetime prevalence of acutely serious reaction to trauma is approximately 19%, or one in five adults. Similar to other recent studies, these results warrant the development of effective early interventions for victims of trauma, an endeavor that is still in its infancy (Litz et al 2002; Ruzek and Watson 2002).

These data also indicate that acute traumatic stress often evolves into chronic disturbance. Symptoms persisted among approximately half of those who had immediate and serious reactions to the index trauma. Just because the modal response is mild and transient, we cannot ignore the needs of trauma survivors whose responses are more psychiatrically critical than that.

This brings us to our third primary conclusion. Persons whose reactions to trauma are serious and chronic differ from persons whose reactions are serious but transient in a number of important ways. Their index events were more likely to have occurred in childhood and to have involved violence, and they had been more highly exposed to other traumatic events during the course of their lives. Although we did not collect data on when precisely these other traumas occurred, previous research suggests that both previous trauma (Breslau et al 1999) and subsequent trauma (Norris and Kaniasty 1994) exacerbate the impact of an index trauma. Victims whose acute distress became chronic were also more severely distressed at the time the trauma occurred. This finding complements those from the prospective studies noted earlier showing that high levels of symptoms in the acute phase foretell the subsequent likelihood of PTSD. The relation between early and later PTSD symptoms is seldom perfect, but it has been consistently strong enough to suggest that it would be advisable to follow up persons who meet all PTSD symptom criteria in the acute phase.

Related to this, but perhaps all the more critical, were the strong differences between the group with serious and chronic reaction and the group with serious but transient reactions in the extent of functional impairment. This was

the single best predictor of chronicity in the discriminant analysis. Although issues of cause and effect must be acknowledged because of the correlational nature of this study, it is plausible that early onset of functional impairment might serve as a critical marker of those who will go on to experience lasting distress. Whether this is true is an important question for future, prospective research to address.

These data may also illustrate the long-term consequences of not intervening, because only a small percentage of trauma victims in Mexico receive any kind of medical or psychologic care (Norris et al, unpublished data). None of the persons included in this analysis had experienced the index trauma in the previous year, and few currently had problems explicitly tied to the events. Yet survivors whose reactions were serious reported more current symptoms of depression than did survivors whose reactions were mild. Their depression scores were well above the Mexican norm (which is well above the U.S. norm, Radloff 1977). Moreover, even after controlling for recency of problems associated with the index trauma, survivors whose reactions had been serious and chronic were more distressed than were survivors whose reactions had been serious and transient. Not only were these groups more depressed, they had more problems with their physical health, including cardiovascular, respiratory, and musculoskeletal problems, as well as more generalized somatic complaints. The impact of PTSD on physical health is emerging as an important arena for trauma research (Schnurr and Jankowski 1999).

In summary, notwithstanding the resilience shown by most people after even quite serious events, these results indicate that acute stress reactions are a significant public health concern. Serious reactions to trauma occur often enough and persist often enough to justify major efforts to prevent, detect, understand, and treat them.

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